

with slightly raised purplish margins, which attain a diameter of 3.5 to 13^{mm}. The mature spots are usually circular, but may become irregular. This disease has been variously attributed to *Phyllosticta*, *Coniothyrium*, and other causes. The present authors obtained pure cultures of *Sphaeropsis malorum* from all young spots which were studied. From older spots other fungi were obtained. Inoculations with this *Sphaeropsis* produced typical disease in 5-20 days upon leaves. The fungus causing the leaf spot in nature is probably derived from cankers on the branches which are frequently abundantly infested.—F. L. STEVENS.

Peat.—From the Geological Survey of Michigan there has recently appeared a volume on peat.²⁸ The work consists of three separate essays under the following titles: The ecology of peat formation in Michigan; The formation, character, and distribution of peat bogs in the northern peninsula of Michigan; Economics of peat. The author presents a classification of the Michigan peat deposits based upon (a) form of land surface, (b) method of development, and (c) surface vegetation, in which he seems to follow previous authors. The place taken by plants in peat formation depends directly upon their specific ecological demands, hence the floristic diversity which appears in the formation of peat in shallow depressions, upon flat areas and raised surfaces. Applying this principle, a thorough study is made of Mud Lake, which lies in the southern peninsula, and the successions are well traced out. The conclusion is reached that light is the principal factor controlling the development of peat through its limiting influence on the growth of plants, both below and above the water level. Physical and chemical characters of the substratum, temperature, aeration, mechanical and physiological effects of the wind, and competition are considered cooperating but secondary factors influencing peat development.

In the second essay the northern peninsula is made the basis of study, and the vegetation of a large number of lakes and ponds is described in some detail, and the conclusions reached from the study of the southern peninsula substantiated. A comparison of the conditions found in the two peninsulas leads to the statement that the noted variety of the sedge zone in the north is to be related to the fact "that in the cooler, more humid climate of the north, the shrubs mentioned are able to grow better in the water than they can in the south." From a study of "Algal Lake," a type of peat hitherto unrecognized, in this country at least, must be added to those which were known before, namely, algal peat, formed almost entirely of the remains of one-celled or few-celled plants.

To part I is appended a detail map of the original swamp area of the southern peninsula; while part II is likewise accompanied by a map of the original vegetation of the upper peninsula. These maps should prove of great service, both in this field and as a permanent record of a vegetation too fast suffering destruction.

²⁸ DAVIS, C. A., Peat. From the report of the Geological Survey for 1906. pp. 95-395. Lansing. 1907.

It is to be regretted that fuller credit for most of the apparently new ideas is not assigned. One looks in vain for acknowledgment of the works of FRÜH and SCHRÖTER, GANONG, and TRANSEAU, whose studies have partially covered the significant results of DAVIS. The mention of these works in their proper places would relieve the book of much that might appear to be an original contribution. The greatest value of the book to the ecologist lies in its careful descriptions of various types of swamps and the detailed record of the distribution of peat-forming species. A complete index makes this material readily available.—LEROY H. HARVEY.

Endodermis of ferns.—The sporadic occurrence of the endodermis and the modifications it shows have been frequently remarked. A comprehensive study of this layer in the fern stem and leaf has been made by BÄSECKE,²⁹ whose contribution may be considered a companion paper to that of RUMPF³⁰ on the fern root.

Following this writer, BÄSECKE distinguishes (1) the primary endodermis, characterized by Caspary's band, and (2) the secondary endodermis, in which the cell walls are more or less thickened and suberized. The leaves of the eusporangiate ferns lack an endodermis, while those of Osmundaceae show only a primary layer; but most of the leptosporangiate ferns are well provided throughout the length of the leaf with a secondary layer. Anatomical and physiological studies show that food manufactured in a fertile leaf first supplies the sporangia, and any excess passes out through the vascular bundles. In rhizomes devoted to storage, only a primary endodermis is found, and in those which are active in propagating the plant a more or less impenetrable layer extends nearly to the growing point; hence the view is maintained that the secondary endodermis serves to prevent the escape of food from the vascular bundles while it is in process of transport.

The second part of the paper describes a reinvestigation of the question as to the occurrence of cork in the ferns, and the conclusion is reached that true cork is never present, but that substitutes are frequent, such as "metacutinized" walls of the outer cell layers. In this respect the ferns are less differentiated than the angiosperms. As to shedding of leaves, the author distinguishes three sorts of absciss layers, in contrast to earlier workers who were unable to find special structures connected with leaf fall. A classification of the various mechanical tissues of ferns concludes the paper.—M. A. CHRYSLER.

Protection from light.—BAUMERT reviews very fully³¹ the many suggestions that appear in literature as to the function of various structures in protecting

²⁹ BÄSECKE, PAUL, Beiträge zur Kenntniss der physiologischen Scheiden der Achsen und Wedel der Filicinen, sowie über den Ersatz des Korkes bei dieser Pflanzengruppe. Bot. Zeit. 66:25-87. pls. 2-4. 1908.

³⁰ RUMPF, G., Rhizodermis, Hypodermis, und Endodermis der Farnwurzel. Bibl. Botan. 62:1904.

³¹ BAUMERT, K., Experimentelle Untersuchungen über Lichtschutzeinrichtungen an grünen Blättern. Beitr. Biol. Pfl. 9:83-162. figs. 6. 1907.